

Thoms, Salmon Bay and Luck Lake sockeye salmon (*Oncorhynchus nerka*) stock assessment project

Abstract: Sockeye salmon (*Oncorhynchus nerka*) returning to Thoms, Salmon Bay, and Luck lakes are an important subsistence resource for the people of Wrangell, Petersburg, and Prince of Wales Island. The Thoms, Salmon Bay, and Luck Lakes sockeye salmon stock assessment project was initiated because of concerns about the potential increase in harvest of sockeye salmon returning to these lake systems. Unfortunately, not much was known about these sockeye stocks until this project was initiated. In this report, we summarize work conducted during the second year of project operations, 2002.

In Thoms Lake, the mark recapture study of the spawning population estimated the minimum sockeye escapement at 5,900 fish. A hydroacoustic survey was confounded by high densities of Chaoborus and did not provide a valid estimate of sockeye fry densities or a total lake population. Sockeye fry comprised 94% of the mid-water trawl sample and the remaining 6% were sticklebacks. The mid-water trawl also provided an estimate of age and species composition; 88% age-0 sockeye fry and 12% were age-1 fry. Thoms Lake had a seasonal mean zooplankton density of 66,000 plankters per m² and a seasonal mean weighted biomass of 119 mg per m². The seasonal mean euphotic zone depth was 2.61 m.

In Salmon Bay Lake, a mark recapture study of the spawning population estimated the minimum sockeye escapement at 43,600 fish. A hydroacoustic survey estimated a sockeye fry density of 0.02 fry per m² and a total lake population of 62,168 sockeye fry. Sockeye fry comprised 70% of the mid-water trawl sample and the remaining 30% were sticklebacks. Ninety-eight percent of the sockeye fry captured in the mid-water trawl were Age-0; 2% were Age-1. Salmon Bay Lake had a seasonal mean zooplankton density of 132,000 plankters per m² and a seasonal mean weighted biomass of 195 mg per m². The seasonal mean euphotic zone depth was 4.46 m.

In Luck Lake, a mark recapture study of the spawning population estimated the minimum sockeye escapement at 16,100 fish. A hydroacoustic survey estimated a sockeye fry density of 0.23 fry per m² and a total lake population of 255,887 sockeye fry. Ninety-nine percent of the sockeye fry captured in the mid-water trawl were age-0. Sockeye fry comprised 97% of the midwater trawl sample and the remaining 3% were sticklebacks. Luck Lake had a seasonal mean zooplankton density of 199,000 plankters per m² and a seasonal mean weighted biomass of 311 mg per m². The seasonal mean euphotic zone depth was 4.66 m.

This year's results provide the foundation for a multiple-year study to assess the health of the sockeye salmon stocks in Thoms, Salmon Bay, and Luck lakes and to set a range of escapement goals capable of sustaining these populations for many generations.

Citation: Lewis, B. A. and M. A. Cartwright. 2004. Thoms, Salmon Bay and Luck Lake sockeye salmon (*Oncorhynchus nerka*) stock assessment project. U. S. Fish and Wildlife, Office of Subsistence Management, Fisheries Resource Monitoring Program, Fisheries Resource Monitoring Program, Fisheries Resource Monitoring Program, 2002 Annual Report (Study No. 01-127). Alaska Department of Fish and Game, Division of Commercial Fisheries. Regional Information Report No. 1J02-25, Douglas, Alaska.